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| MANELLI DENISON & SELTER<br>2000 M STREET NW SUITE 700<br>WASHINGTON, DC 20036-3307 |             |                      | MOORE, IAN N        |                  |
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|   |             |                      | 2661                |                  |

DATE MAILED: 11/05/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/637,015

Applicant(s)

KRISHNA ET AL.

Examiner

Ian N Moore

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2,5. 6) ☐ Other: \_\_\_\_

## **DETAILED ACTION**

### ***Information Disclosure Statement***

The information disclosure statement (IDS), submitted on November 21, 2000 regarding commonly assigned copending application, is being considered by the examiner.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

1. Regarding Claim 5 and 11, it is unclear what and where "expression portion" (Claim 5-line 4 and Claim 11-line 5), "a comparison operand" (Claim 5-line 1), and "template identifier field" (Claim 5-line 5 and Claim 11-line 5) are. The specification neither clearly disclose nor provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

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2. Claim 1-6, 8-9, and 11-15 are rejected under 35 U.S.C. 102(e) as being anticipated by Deb (U.S. 6,172,990).

**Regarding Claim 1**, Deb '990 discloses a method of evaluating an incoming data packet at a network switch port, the method comprising:

storing a plurality of templates configured for identifying respective data formats (see Fig. 3A Programming instruction set; and col. 11, line 13-14 and 43-48; noted that the user may configure a software instruction set by designating a specific instruction to be performed on in-coming packet. These instructions are set to identify for various type of data format (i.e. IP, TCP, and SNMP type). Therefore, it is clear that instruction identifies the type of data format of the incoming packet.), each template having at least one min term (see Fig. 3A, the user defined data structure type and contents; see col. 12, line 46-56; noted that per specification (page 6, line 17 to page 7, line 4), “min term” has a function of defining a specific data format. The “data structure type and contents” also has a function of defining a specific data format. Therefore, it is clear that data structure type and content is the “min term”.) configured for comparing a corresponding prescribed value to a corresponding selected byte of the incoming data packet (see Fig. 3B, Analyzing Computer 337; and col. 13, line 4-35, noted that the user defined contents are loaded/stored into the CAM 334, RAM 302, Comparators 336. A selected word/field (i.e. a word/field = a byte) from the incoming packet stream is being compared to the user defined instruction set. Moreover, since the user instruction set/content includes a “field” for each data type (i.e. TCP header field, IP header field, Application header field, IP destination address field, and etc.) of the incoming packet, it is clear that the comparing process must be done between the field/word of the incoming

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packet and respective field/word of the instruction set stored in the memory.); **also see Fig. 4A method step 402; Fig. 4B; and col. 25, line 20-29;**

simultaneously comparing (see Fig. 3B, Analyzing Computer 337; and col. 13, line 36-50, each word/field is being processed in parallel format utilizing pipeline register stages. Since each stage processes each word in paralleling manner, it is clear that the comparing/examining process is also occurring in paralleling manner.), to the selected byte, the min terms that correspond to the selected byte immediately upon receipt of the selected byte by the network switch port (see col. 13, line 51 to col. 14, line 6; noted that a selected word from an in-coming packet is being compared/examined according to the user defined data structure type and contents at the analyzing computer. Moreover, since the comparing/examining process (i.e. step 404) begins at the initial position of the received packet, it is clear that the process starts as soon as the packet arrived at the port.); **also see Fig. 4A method step 404 and 406; Fig. 4C; and col. 25, line 31-32;**

generating a comparison result that identifies the incoming data packet, based on the comparisons of the min terms to the data bytes of the entire packet received by the network switch port (see col. 14, line 13-61; noted that compared/computed output (i.e. in the form of the data structure) between selected word and the user defined data instructions are produced at the analyzing computer. The data structure contains the information regarding computed results such as TCP header field, IP header field, the source and destination addresses, and etc. Therefore, it is clear the "comparison result" is the "computed output". ); **Also see Fig. 4A method step 408; and col. 25, line 33-35; and**

generating a frame tag (see Fig. 8, Encapsulation header 804 is a frame tag); based on the comparison result as soon as a last bit of the data packet is received at the network switch port (see col. 29, line 10-29; and col. 21, line 30-46; noted that a new tag header is generated with an appended index (i.e. the user defined instructions) based upon compared/determined output data; **also see Fig. 4A method step 408; and see col. 26, line 41-44.**

**Regarding Claim 2,** Deb '990 discloses the simultaneously comparing step includes: loading the min terms (see Fig. 4A, step 402; and col. 16, line 15-19) corresponding to a first of the data bytes into a min term generator (see Fig. 4A, step 404; and see col. 16, line 24-39; noted that the user defined instruction/context are loaded/stored in the RAM, CAM, and Comparators associating to the initial byte of an incoming packet. Also, Analyzing Computer 337 in Fig. 3B has a functionality of a min term generator);

comparing in parallel the min terms loaded in the min term generator with the first of the data bytes (see Fig. 4A, step 406; col. 16, line 47-52; since the incoming packet are stored in the pipe line register stages in order, the first word (i.e. word count "0") is used when examining/comparing the received packet); and

outputting comparison results for the min terms loaded in the min term generator to an evaluation core (see Fig. 4A, step 408; col. 16, line 55-61; noted that after comparing/determining, the output from compared/determined data based upon comparisons are transferred to the Mux 318 and data transfers register 316. Thus, an evaluation core is a

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combined system of Analyzing Computer 337, Mux 318, and Data Structure Register 316 of Fig. 3B.).

**Regarding Claim 3**, Deb '990 discloses the simultaneously comparing step further includes loading the min terms corresponding to a second of the data bytes, contiguously following the first of the data bytes, into the min term generator (see Fig. 4C; col. 25, line 39-58; and col. 13, line 34-50; noted that a second of the data byte is stored contiguously according to the method defined in Fig. 4C).

**Regarding Claim 4**, Deb '990 discloses outputting the frame tag to a switch fabric (see Fig. 2A, a combined system of Tx micro-RISC Stream Processor 114a and Switch Table Lookup 806) configured for selectively switching the incoming data packet based on the corresponding frame tag (see col. 21, line 14-61; and col. 22, line 46-57; noted that the user defined appendix is append to an incoming packet, transferred to a lookup switch table, outputted to a transmit processor to encapsulate the tag, and then routed/switched accordingly.)

**Regarding Claim 5**, Deb '990 discloses the storing step includes storing each min term in a memory as a table entry (see Fig. 3A, RAM 302, CAM 334, and Comparators 336), each table entry having a location in the memory based on a location of the corresponding selected byte in the incoming data packet (see col. 13, line 24-35; noted that the user instructions are resident in word count 308 is configured to identify a desired word

count in an in-coming packet. Therefore, it is clear that there is a location in the memory regarding a selected word so that the system can correctly determine/compare it according to the user defined instruction stored in the memory),

the table entry including a min term expression portion specifying the corresponding prescribed value and a comparison operand (see Fig. 3A, Data structure content field; and col. 11, line 43-56; noted that a data structure content field (i.e. pointer, data, and/or other) is used to identify what determination/operation will be performed), and

a template identifier field that specifies the templates that use the corresponding min term (see Fig. 3A, Data structure type field and col. 11, line 43-56; noted that a data structure type field (i.e. a Standard data, flag, or other fields) is used to identify what type of the user defined instruction will be used for comparison operation.)

**Regarding Claim 6,** Deb '990 discloses the generating step includes:

temporarily storing results of the comparisons of the min terms to the selected bytes of the incoming data packet (see col. 14, line 28-30; noted that the compared/computed output data are stored in a data structure having a pointer to the currently selected word.)

detecting at least one matched template from the plurality of templates based on the results of the comparisons of the min terms and generating the comparison result based on the detected at least one matched template (see col. 13, line 17-23; a match signal is produced (i.e. match found) after matching according to the CAM 334 look up table which stored plurality of user defined instructions and the corresponding entry (i.e. compared/determined output data) are outputted.)



**Regarding Claim 8**, Deb '990 discloses the first of the data bytes corresponds to a first of the data bytes of a packet having a prescribed format, the simultaneously comparing step including evaluating the selected data byte relative to a beginning of the packet having the prescribed format (see col. 13, line 51 to col. 14, line 6; noted that the determination is performed by the analyzing computer from the initial word (i.e. beginning of the packet) and continues consecutively).

**Regarding Claim 9**, Deb '990 discloses the prescribed format is Internet protocol (IP) format (see Fig. 9, IP switching 3 – IP header 910 and data 906; and col. 20, line 54-60).

**Regarding Claim 11**, Deb '990 discloses a network switch port filter configured for evaluating an incoming data packet, comprising:

a min term memory (see Fig. 3; RAM 302, CAM 334 and Comparators 336 which stored Programming instruction set) configured for storing min term values (see col. 11, line 13-14 and 43-49; noted that the user may configure the software instruction set by designating a specific instruction to be performed on in-coming packet. These instructions are set to identify the various type of data format (i.e. IP, TCP, and SNMP type). Therefore, it is clear that the instruction set identifies the type of data format of the incoming packet), each min term value (see Fig. 3A, data structure type and contents; and col. 11, line 18-20; noted that per specification (page 6, line 17 to page 7, line 4), “min term” has a function of defining a specific data format. The “data structure type and contents” also has a function of

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defining a specific data format. Therefore, it is clear that data structure type and contents is the “min term”.) stored based on a location of a corresponding selected byte of the incoming data packet for comparison (see Fig. 3B, Analyzing Computer 337; and col. 13, line 4-35, noted that the user defined contents are loaded/stored into the CAM 334, RAM 302, and Comparators 336. A selected word/field (i.e. a word/field = a byte) from the incoming packet stream is being compared to the user defined instruction set/contents. Moreover, since the user instruction set/content includes a “field” or “word” for each data type (i.e. TCP header field, IP header field, Application layer header field, IP source/destination address field, and etc.) of the incoming packet, it is clear that the comparing process must be done between a word/field of the incoming packet and respective field/word of the instruction field stored in the memory.), an expression portion specifying a corresponding comparison operation (see Fig. 3A, Data structure content field and col. 11, line 43-56; noted that a data structure content field (i.e. pointer, data, and/or other) is used to identify what determination/operation will be performed), and a template identifier field that specifies templates that use the corresponding min term (see Fig. 3A, Data structure type field and col. 11, line 43-56; noted that a data structure type field (i.e. a Standard data, flag, or other fields) is used to identify what type of the user defined instruction will be used for comparison operation);

a min term generator (see Fig. 3B, Analyzing Computer 337; noted that analyzing computer performs both equation core and min term generating function.) configured for simultaneously comparing a byte of the incoming data packet (see col. 13, line 36-50, each word/field is processing each word/field in paralleling manner by utilizing pipeline register stages. Since each stage is processing each word in paralleling manner, it is clear that the

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comparing/examining process is also occurring in paralleling manner.), immediately upon receipt of the incoming data byte (see col. 13, line 51 to col. 14, line 6; noted that a selected word from an in-coming packet is being compared/examined to the user defined data structure type and contents at the analyzing computer. Moreover, since the comparing/examining process (see Fig. 4A, step 404) begins at the initial position of the received packet, it is clear that the process starts as soon as the packet arrived at the port.), with the min terms that correspond to the received byte and generating respective min term comparison results (see col. 14, line 34-61; noted that the compared/computed output (i.e. in the form of the data structure) between selected word and the user defined data instructions are produced at the analyzing computer. The data instruction contains the information regarding the computed output such as TCP header field, IP header field, the source and destination addresses, and etc. Therefore, it is clear that the “comparison results” is the “computed/determined output”. ); And

an equation core (see Fig. 3B, Analyzing Computer 337; noted that analyzing computer performs both equation core and min term generating function.) configured for generating a frame tag identifying the incoming data packet based on the min term comparison results relative to the templates (see col. 29, line 10-29; and col. 21, line 30-46; noted that a new tag header is generated with an appendix index (i.e. the user defined contents) based upon compared/computed output data).

**Regarding Claim 12**, Deb '990 discloses a frame identifier (see Fig. 3B, CAM 334) configured for identifying a type of layer 2 packet (see col. 9, line 18-23; and col. 13, line 16-

23; noted that MAC layer is a Layer 2, and the CAM identifies by utilizing a look up table to process for each word type before passing over to the higher layers), the selected byte of the incoming data packet determined based on the identified type of layer 2 packet (see col. 13, line 59-63; col. 19, line 59 to col. 20, line 3; and Fig. 5A and 5B; noted that selected word of the incoming packet is determined according to the user defined instructions for different type of layer 2.)

**Regarding Claim 13,** Deb '990 discloses the location of each stored min term value is relative to a beginning of an IP frame (see Fig.9, IP header 910; and col. 20, line 54-60; noted that received packet header is an IP header, and therefore, it is an IP frame.) within the layer 2 packet (see col. 13, line 33-50; the user defined instructions are resident in word count 308, and it is configured to identify a desired word count in an in-coming packet. Each time a new packet is received by micro-RISC stream processor 114a, a word counter 307 will reset to "0", and then word counter 307 begins sequentially counting each word that is received into pipeline register stages 323 from data path 115a. Therefore, each stored the user defined instruction is relative to a beginning of an IP frame).

**Regarding Claim 14,** Deb '990 discloses a min term controller (see Fig. 3B, Execution Logic 312) configured for fetching the min terms from the min term memory corresponding to a selected byte of the IP frame within the incoming data packet (see col. 15, line 45-49 and col.14, line 12-19; noted that the execution logic unit is preferably designed to control the examination of the received packet by the analyzing computer.)

**Regarding Claim 15**, Deb '990 discloses the equation core generates the frame tag at a wire rate of the incoming data packet and prior to an end of the incoming data packet (see col. 11, line 21-42; col. 21, line 30-46; and col. 29, line 10-27; Noted that both Tx and Rx micro-RISC stream processors are considered as one system. Therefore, the processor has a capability of generation a frame tag, which encapsulates to the data frame.)

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claim 7 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Deb '990 in view of Connery (U.S. Patent 6,570,884).

**Regarding claim 7**, Deb '990 discloses generating one final frame tag when one template matches the incoming data packet as described above in Claim 1, 5, 6.

Deb '990 does not explicitly disclose including resolving a priority of templates (see Connery '884 Fig. 3, Pattern Match units 1-4) to one final template when more than one template matches the incoming data packet (see Connery '884 col. 7, line 52-62; noted that when there are multiple matching of patterns (i.e. more than one matching to the defined pattern), the processor determines the final matching format).

However, this limitation is taught by Connery '884. Noted that Deb '990 teaches generating a final tag value after matching the words to the user-defined instructions. Deb '990 further teaches prioritizing the incoming data traffic at the receiver utilizing various buffers (see Deb '990 col. 10, line 59-65) and transmitting different type of traffic according to the priority (see Deb '990 col. 7, line 33-38). Deb '990 also teaches the user-defined instruction, and the user is able to define/prioritize the traffic type (i.e. voice vs. data or IP vs. SNMP) for by utilizing instruction. Connery '884 teaches prioritizing/finalizing/defining the final match if there is more than one match. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system of Deb '990 as taught by Connery '884 for the purpose of the hardware pattern matching logic which supports pattern matching at the speed of the incoming packet stream, and signals the embedded processor when a packet having one of the plurality of variant formats is detected, see Connery '884 col. 3, line 46-53. The motivation being that by determining/finalizing a match pattern, it can minimize the probability of faulty matches.

**Regarding claim 16,** Deb '990 discloses a tag generator device generating a final frame tag value after a given template matches the incoming data packet as described above in claim 11.

Deb '990 does not explicitly disclose a priority device (see Connery '884 Fig. 3, Processor 220) configured for resolving a priority of templates (see Connery '884 Fig. 3, Pattern Match units 1-4) to one final frame template when more than one template matches the incoming data packet (see Connery '884 col. 7, line 52-62; noted that when there are

multiple matching of patterns (i.e. more than one matching to the defined pattern), the processor determines the final matching format).

However, this limitation is taught by Connery '884. Noted that Deb '990 teaches a tag generator device, which generates a final tag value after matching words to the user defined instruction. Deb '990 further teaches prioritizing the incoming data traffic at the receiver utilizing various buffers (see Deb '990 col. 10, line 59-65) and transmitting different type of traffic according to the priority (see Deb '990 col. 7, line 33-38). Deb '990 also teaches the user-defined instruction (i.e. templates), and the user is able to define/prioritize the traffic type (i.e. voice vs. data or IP vs. SNMP) for by utilizing the instruction/templates. Connery '884 teaches a processor device, which prioritizes/finalizes the final match. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system of Deb '990 as taught by Connery '884 for the purpose of the hardware pattern matching logic which supports pattern matching at the speed of the incoming packet stream, and signals the embedded processor when a packet having one of the plurality of variant formats is detected, see Connery '884 col. 3, line 46-53. The motivation being that by determining/finalizing a match pattern, it can minimize the probability of faulty matches.

4. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Deb '990 in view of Bellenger (U.S. 5,802,054).

**Regarding Claim 10,** Deb '990 discloses the step of generating the comparison result based on the detected at least one matched template includes: identifying for each of the min

terms compared with the incoming data packet and specifying a unique result for a selected group of the templates; and generating the comparison result by having the detected at least one matched template as described above in Claim 1, 5, and 6.

Deb '990 does not explicitly disclose an equation (see Bellenger '054 col.13, line 61 to col.14, line 39; noted that a template register (i.e. an equation) where each bit specifies one byte of each header.), each equation specifying a unique result for a selected group of the templates; and generating the comparison result by the equation (see col. 14, line 38 to col. 15, line 10; see also Fig. 6; noted that there are plurality of registers (i.e. equations) loaded with templates, and each register has a specific filtering functions depending on many protocol possibilities (i.e. the second register detects a specific protocol type, and the third register detects a hierarchy number, and etc.) Then, the multiplexer multiplexes each resulted/selected-filtered data into one unique result and outputted.)

However, this limitation is taught by Bellenger '054. Noted that Deb '990 teaches generating comparison results per the user defined types and instructions. Bellenger '054 discloses plurality of template registers (i.e. equations) performing parallel processing in order to obtain unique result. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system of Deb '990 as taught by Bellenger '054 for the purpose of utilizing a logic which identifies an incoming frame and generates a value very quickly; thus, by allowing for cut through of frames in a switch node, a transmission of a frame on an outgoing port can begin before the complete frame has been received at the incoming port. Therefore, a high bandwidth and very flexible network switch is achievable according to the present invention with a simple, scalable, low-cost



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architecture, see Bellenger '054 col. 4, line 23-39 and col. 17, line 5-7. The motivation being that by performing simultaneous/cut through filtering function, it can increase flexibility of the switch and increase the bandwidth of the transmission.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ian N Moore whose telephone number is 703-605-1531. The examiner can normally be reached on M-F: 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Doug Olms can be reached on 703-305-4703. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-3900.

Ian N Moore  
Examiner  
Art Unit 2661

INM  
10/28/03



**KENNETH VANDERPUYE**  
**PRIMARY EXAMINER**